## REMARKS/ARGUMENTS

Within the final Office Action, claims 1-3, 5, 6, 8, 15-20, 27, 29, 30, 34-37, 39, 40, 42, 49, 56, 59, and 62 are rejected under 35 U.S.C. § 102(b); claims 7, 9-14, 28, 33, 41, 43-48, 57, 58, and 63-65 are rejected under 35 U.S.C. § 103(a); and claims 21-24 and 50-53 are objected to. Claims 4, 25, 26, 31, 32, 38, 54, 55, 60, 61, and 66-81 were previously withdrawn.

By way of the above amendments, claims 1 and 35 have been amended. Accordingly, claims 1-3, 5-24, 27-30, 33-37, 39-53, 56-59, and 62-65 are now pending. The Applicants respectfully request further examination and reconsideration in view of the amendments made above and the arguments set forth below.

**The present invention**

The present invention is directed to heat sinks for cooling heat-generating devices. The heat sinks have vertically stacked routes or channels for carrying cooling fluids and other materials. As stated in the Specification, one advantage of the vertically stacked channels is that they "allow substantially uniform pressure flows within the channels and allow the flow of cooling materials to be accurately concentrated over specific areas." Specification, page 2, lines 8-10. In operation, heat is exchanged between cooling materials circulating within adjacent stacked routes, thereby efficiently cooling the heat-generating devices. *Id.*, lines 19-20.

**The recitation of "vertically stacked routes" overcomes any rejections under 35 U.S.C. §§ 102, 103, and 112, second paragraph.**

Within the final Office Action, under the heading "Response to Arguments," it is stated, "The term 'stack' is defined as 'a large quantity or number' or 'pile' which means to collect little by little into a mass (Merriam Webster's Collegiate Dictionary 10th Edition)." It is then stated that prior art discloses elements that meet these definitions. In later sections within the final Office Action, the independent claims that recite the term "stack" are rejected under 35 U.S.C. §§ 102(b) and 103(a) in light of this prior art and the definitions.

Also, as far as the Applicants understand later statements made in the final Office Action under the heading "Allowable Subject Matter," it is stated that because the term "stack" has several definitions, the claims that recite that term are properly rejected under 35 U.S.C. § 112, second paragraph, because they do not particularly point out and distinctly claim the subject matter which the Applicants regard as their invention. While the Applicants disagree with these rejections, to further prosecution they have amended the independent claims 1 and 35 to recite

"vertically stacked," a term defined in the Specification. In light of these amendments, the rejections under 35 U.S.C. §§ 102(b), 103(a), and 112, second paragraph, are now moot.

The term "vertically stacked" is defined at page 9, lines 9-11, of the Specification: "As illustrated in Figure 1, a cross section of the channels 105A-C all lie in a single plane, substantially perpendicular to the bottom plane 150A, *one located above another*, and are thus described as vertically stacked" (italics added). This definition trumps any other definition offered by Merriam Webster's Collegiate Dictionary or any other dictionary: "When the specification states the meaning that a term in the claim is intended to have, the claim is examined using that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art." M.P.E.P. § 2173.05(a)(I) at 2100-216 (Rev. 3, August 2005) (citing *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989)). Thus, the definition of "vertically stacked" given in the Specification controls over multiple, abstract definitions listed in a general-purpose dictionary.

In light of this clear definition, the claims that recite "vertically stacked" do particularly point out and distinctly claim the subject matter that the Applicants regard as their invention. Moreover, in light of this definition, the claims clearly recite structure not taught in the prior art and thus distinguish over the prior art.

**Rejections Under 35 U.S.C. §102(b)**

*Galyon*

Within the final Office Action, claims 1-3, 5, 6, 8, 20, 27, 29, 30, 35-37, 39, 40, 42, 49, 56, and 59 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,016,090 to Galyon et al. In light of the amendments made above, these rejections are now moot.

Galyon is directed to an integrated circuit cooling module. As Galyon explains in its Abstract, the module comprises two sets of channels that run perpendicular to one another. A first set is formed on a base plate and the second set, perpendicular to the first, includes a set of inlet channels and a set of interleaved outlet channels. Figure 9 of Galyon, cited within the final Office Action, is a cross-section of the module showing adjacent routes. As Galyon explains at column 7, lines 10-27, the cross-section shows routes from an inlet channel 808, down an extended tube 901, into a spherical cavity 902, up to an opening 809, and through an outlet

channel 810. Galyon does not disclose vertically stacked routes, one above another, as recited in the independent claims 1 and 35 and defined within the Specification of the present invention.

The independent claim 1 is directed to a heat exchanger comprising a manifold layer coupled to an interface layer. The manifold layer has a first plurality of openings for providing a cooling material to the heat exchanger and a second plurality of openings for removing the cooling material from the heat exchanger. The interface layer has a plurality of *vertically stacked* routes. Each route extends from one of the first plurality of openings and terminates at a corresponding one of the second plurality of openings. Each route is for carrying the cooling material. A cross-section of the plurality of routes is substantially contained in a plane non-parallel to a heat-exchanging plane.

As described above, Galyon does not disclose an interface layer having a plurality of vertically stacked routes, as recited in claim 1. For at least this reason, claim 1 is allowable over Galyon.

Claims 2, 3, 5, 6, 8, 20, 27, 29, and 30 all depend on the independent claim 1. As described above, the independent claim 1 is allowable over the teachings of Galyon. Accordingly, claims 2, 3, 5, 6, 8, 20, 27, 29, and 30 are also all allowable as being dependent on an allowable base claim.

The independent claim 35 is directed to a method of forming a heat exchanger. The method comprises, in relevant part, forming an interface layer having a plurality of *vertically stacked* routes that each extends from one of a first plurality of openings and terminates at a corresponding one of the a second plurality of openings.

As described above, Galyon does not disclose an interface layer having a plurality of vertically stacked routes, as recited in claim 35. For at least this reason, claim 35 is allowable over Galyon.

Claims 36, 37, 39, 40, 42, 49, 56, and 59 all depend on the independent claim 35. As described above, the independent claim 35 is allowable over the teachings of Galyon. Accordingly, claims 36, 37, 39, 40, 42, 49, 56, and 59 are also all allowable as being dependent on an allowable base claim.

*Meyerhoff*

Within the final Office Action, claims 1-3, 5, 6, 8, 15-20, 27, 29, 30, 34-37, 39, 40, 42, 49, 56, 59, and 62 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,361,195 to Meyerhoff. In light of the amendments made above, these rejections are now moot.

Meyerhoff is directed to a heat sink for a semiconductor device. Figure 10 of Meyerhoff, for example, shows a cross-section of a heat sink 206 coupled to an adapter unit 208. The heat sink 206 contains passageways 210 that, together with passageways 212 in the adapter unit 208, provide a fluid flow path. While it is stated within the final Office Action that Meyerhoff discloses routes "stacked or piled into a bunch in a middle portion of the interface layer" (using Merriam Websters's definition), Meyerhoff does not disclose *vertically* stacked routes as recited in the independent claims 1 and 35 of the present invention.

As explained above, claim 1 recites, in relevant part, an interface layer with a plurality of vertically stacked routes. As described above, Meyerhoff does not disclose vertically stacked routes as recited in claim 1. For at least this reason, claim 1 is allowable over Meyerhoff.

Claims 2, 3, 5, 6, 8, 15-20, 27, 29, 30, and 34 are all dependent on the independent claim 1. As described above, the independent claim 1 is allowable over the teachings of Meyerhoff. Accordingly, claims 2, 3, 5, 6, 8, 15-20, 27, 29, 30, and 34 are also all allowable as being dependent on an allowable base claim.

As explained above, claim 35 recites, in relevant part, forming an interface layer having vertically stacked routes. As described above, Meyerhoff does not disclose forming an interface layer having vertically stacked routes, as recited in claim 35. For at least this reason, claim 35 is allowable over the teachings of Meyerhoff.

Claims 36, 37, 39, 40, 42, 49, 56, 59, and 62 are all dependent on the independent claim 35. As described above, the independent claim 35 is allowable over the teachings of Meyerhoff. Accordingly, claims 36, 37, 39, 40, 42, 49, 56, 59, and 62 are also all allowable as being dependent on an allowable base claim.

**Rejections Under 35 U.S.C. § 103(a)**

Within the final Office Action, claims 7, 9-14, 41, and 43-48 are rejected under 35 U.S.C. § 103(a) as obvious over Meyerhoff. Within the final Office Action it is stated that Meyerhoff substantially discloses all of the Applicants' invention, except for a suitable material for a thermal interface layer. The Applicants respectfully traverse these rejections.

Claims 7 and 9-14 all depend on claim 1. As explained above, claim 1 is allowable over Meyerhoff. Accordingly, claims 7 and 9-14 are all also allowable as depending on an allowable base claim.

Claims 41 and 43-48 all depend on claim 35. As explained above, claim 35 is allowable over Meyerhoff. Accordingly, claims 41 and 43-48 are all also allowable as depending on an

allowable base claim.

Within the final Office Action, claim 33 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 5,309,319 to Messina. Within the final Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for a pump, as disclosed in Messina. The Applicants respectfully traverse this rejection.

Claim 33 depends on claim 1. As explained above, claim 1 is allowable over Meyerhoff. Accordingly, claim 33 is allowable over Meyerhoff, Messina, and their combination.

Within the final Office Action, claim 64 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 5,274,920 to Mathews. Within the final Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for a plate with flow channels formed by stamping, as disclosed in Mathews. The Applicants respectfully traverse this rejection.

Claim 64 depends on claim 35. As explained above, claim 35 is allowable over Meyerhoff. Accordingly, claim 64 is allowable over Meyerhoff, Mathews, and their combination.

Within the final Office Action, claim 65 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 6,477,045 to Wang. Within the final Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for a plate with flow channels formed by injection molding, as disclosed in Wang. The Applicants respectfully traverse this rejection.

Claim 65 depends on claim 35. As explained above, claim 35 is allowable over Meyerhoff. Accordingly, claim 65 is allowable over Meyerhoff, Wang, and their combination.

Within the final Office Action, claims 28, 57, 58, and 63 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyerhoff in view of U.S. Patent No. 5,099,311 to Bonde et al. and either one of U.S. Patent No. 6,492,200 to Park et al. and U.S. Patent No. 3,771,219 to Tuzi et al. Within the final Office Action, it is stated that Meyerhoff discloses substantially all of the Applicants' invention, except for the limitation that a heat generating device is integrally formed at the bottom of the interface layer, as disclosed in Bonde combined with either Park or Tuzi. The Applicants respectfully traverse these rejections.

Claim 28 depends on claim 1, claims 57, 58, and 63 all depend on claim 35. As explained above, claims 1 and 35 are both allowable over Meyerhoff. Accordingly, claims 28, 57, 58, and 63 are all allowable over Meyerhoff, Bonde, Park, Tuzi, and their combination.

**Allowable Subject matter**

Within the final Office Action, under the heading "Allowable Subject Matter," it is stated that "[c]laims 21-24 and 50-53 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this [final] Office action and to include all of the limitations of the [corresponding] base claim and any intervening claims."

The final Office Action does not label any rejections as being made under 35 U.S.C. § 112, second paragraph. The Applicants interpret the statements made under the heading "Response to Arguments" to be the rejection under § 112, second paragraph. Specifically, the Applicants understand the argument to support the § 112, second paragraph, to be: (1) The term "stack" as recited in claim 1 (from which claims 21-24 depend) and claim 35 (from which claims 50-53 depend) can be defined as "'a large quantity or number' or 'pile' which means to collect little by little into a mass (Merriam Webster's Collegiate Dictionary 10th Edition)." (2) Because the term "stack" can be defined in different ways, the claims that recite "stacked" are indefinite and thus do not particularly point out and distinctly claim the subject matter which the Applicants regards as their invention (35 U.S.C. § 112, second paragraph).

This argument is now moot. The Applicants have amended the independent claims 1 and 35 to recite "vertically stacked," a term that is clearly defined within the Specification. Claims 1 and 35, and all the claims that depend on them, are thus definite. Accordingly, the rejection of claims 1 and 35, and all the claims that depend on them, under 35 U.S.C. § 112, second paragraph, should be withdrawn.

Furthermore, as explained above, claims 1 and 35 are allowable. Accordingly, claims 21-24 and 50-53, which depend on claims 1 and 35, are all also allowable as depending on an allowable base claim.

**Consideration of Information Disclosure Statements**

The Applicants respectfully ask the Examiner to consider the following information disclosure statements and then sign, initial and return copies of them for the Applicants' records:

- Form PTO-1449, filed March 4, 2004
- Form PTO-1449, filed August 31, 2004
- EFS ID # 76775, filed January 26, 2005
- EFS ID # 77189, filed February 1, 2005
- EFS ID # 83392, filed May 2, 2005

## CONCLUSION

For the reasons given above, the Applicants respectfully submit that claims 1-3, 5-24, 27-30, 33-37, 39-53, 56-59, and 62-65 are now in a condition for allowance, and allowance at an early date would be appreciated. If the Examiner has any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss them so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: 12-2-05

By: _____
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CERTIFICATE OF MAILING (37 CFR§ 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450

HAVERSTOCK & OWENS LLP

Date: 12-2-05 By: _____